Environmental Assessment Checklist

Project Name: Cottonwood Creek Diversion Repair
Proposed Implementation Date: December 2018, July-August 2019
Proponent: Clearwater Unit, Southwest Land Office, Montana DNRC
County: Missoula County

Type and Purpose of Action

Description of Proposed Action:

The Clearwater Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing to repair an existing irrigation diversion on Cottonwood Creek. The project is located approximately 9 air miles southeast of Seeley Lake, Missoula County (Attachment A-**1** and project map A-**2**) and includes the following sections:

- 16N 14W 24

Objectives of the project include:

- Repair an existing irrigation diversion structure that was damaged during high stream discharge in spring 2018.

Proposed activities include:

Action	Quantity
Other Activities	
Irrigation Diversion Repair	0.05 Acres

Duration of Activities:	4-5 days
Implementation Period:	Nov. 2018-September 2019

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan (DNRC 1996),
- Administrative Rules for Forest Management (ARM 36.11.401 through 471),
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- and all other applicable state and federal laws.

Project Development

SCOPING:

- DATE:
  - Site Visit: 10/5/2018
- PUBLIC SCOPED:
  - Public scoping was not conducted for this project as the majority of the actions proposed in this project are eligible to be covered under the categorical exclusion process.
- AGENCIES SCOPED:
  - FWP: Patrick Uthe, FWP Regional Biologist, Pat Saffel, FWP Regional Fisheries Supervisor: 124 permit and site visits to discuss project.
  - ACOE: Permitting authority for project activities related to 404 permit
  - USFWS: ESA authority on 404 permit
- COMMENTS RECEIVED:
  - How many: 1
  - Concerns: FWP is concerned about the construction of a hardened streambank using rip-rap to restore bank conditions at the site. It was requested that the diversion abandonment be completed using an artificial log-jam structure.
  - Results (how were concerns addressed): Through discussions with FWP, ACOE and USFWS, construction of the artificial log-jam structure will be completed during the instream work window during July-August 2019. Temporary rip-rap will be placed in December 2018 to minimize further channel avulsion into the existing ditch system at the point of diversion.

DNRC specialists were consulted, including: Andrea Stanley, Hydrologist SWLO; Mike Anderson, Fisheries Biologist FMB; Patrick Rennie, Archeologist TLMD.

Internal and external issues and concerns were incorporated into project planning and design and will be implemented in associated contracts.

OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED: *(Conservation Easements, Army Corps of Engineers, road use permits, etc.)*

- **United States Fish & Wildlife Service-** DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands HCP and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at http://dnrc.mt.gov/divisions/trust/forest-management/hcp.

- **Montana Department of Fish, Wildlife and Parks (DFWP)-** A Stream Protection Act Permit (124 Permit) is required from DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries. A Short-term Exemption from Montana's Surface Water Quality Standards (318 Authorization) may also be required from DEQ if activities such as replacing a bridge on a stream would introduce sediment above natural levels into streams.
    - Such activities include:
        - Alteration of the existing streambank on Cottonwood Creek
        - Excavation of sediment deposition opposite the diversion point.
- **Army Corps of Engineers (ACOE)**-Clean Water Act Permit (404 Permit) is required for activities outside of timber management actions that would impact streams, wetlands, or other waters administered under the Clean Water Act. Such activities include:
    - Alteration of the existing streambank on Cottonwood Creek
    - Excavation of sediment deposition opposite the diversion point

ALTERNATIVES CONSIDERED:

No-Action Alternative: The No-Action Alternative would leave the irrigation diversion in the existing state.

Action Alternative: The objective of the project is to reconstruct approximately 30 feet of streambank at an existing irrigation point of diversion on Cottonwood Creek. During spring 2018, heavy snowpack in combination with post-fire increases in stream discharge, following the Rice Ridge Fire, led to erosion and ultimately failure of an existing irrigation diversion structure on Cottonwood Creek. The diversion structure was a 24" CMP with a metal headgate embedded in a rock-gabion basket wall, which extended approximately 25-30 feet upstream and 20-25 feet downstream from the diversion point. High discharge led to erosion of the rock-gabion baskets and failure of the lower 25-30 feet of gabion wall. Loss of the structure led to displacement of the gabion baskets and material immediately downstream from the diversion point, constricting Cottonwood Creek from an active channel width of 20-25 feet to less than 10 feet (Figures 2 and 3). Constriction of the stream channel led to continued erosion of the gabion wall and displacement of the CMP. Following the loss of the structure and gabion wall, 25-30% of the total discharge in Cottonwood Creek was flowing down the ditch system, likely entraining native salmonids. Currently, approximately 10% of the baseflow of Cottonwood Creek is being delivered down the irrigation diversion. The constriction point also led to significant substrate deposition on the streambank opposite the diversion structure, which has concentrated discharge on the diversion side of the stream channel. Approximately 100 feet downstream from the diversion structure, another constriction point narrows the active channel to approximately 10 feet (Figure 4). Both constriction points will be removed to increase channel capacity and minimize substrate deposition at the diversion point which would be eliminated and the ditch system would be plugged.

Planned project activities include; and are depicted in Figure 5:

1. Removal of the CMP and headgate structure
2. Excavation and removal of the gabion baskets causing the constriction immediately downstream from the diversion point to increase channel capacity and facilitate substrate mobilization.

3. Removal of the lower constriction point to increase channel capacity.
4. Temporarily reconstruct channel dimensions at the diversion point, including;
    a. Reconstruct approximately 50 feet of streambank at the diversion point
    b. Installation of geotextile on the streambank to minimize piping and fine sediment loss
    c. Bank armoring with 18-24 inch rip-rap at the diversion point to minimize potential erosion
5. Install permanent log-jam structure during low-flow periods within the Westslope Cutthroat and Bull trout instream work window in 2019.
6. Revegetate the constructed streambank and ditch plug.
7. Restore any areas disturbed by equipment during construction.

Representative upstream cross-sectional and longitudinal profiles will be used to reconfigure the stream channel at the diversion point following the elimination of the point of diversion (Figure 6). Active channel width will range from 18-25 feet with representative depths and substrate.

Access corridors used during the project will be restored to the existing condition, with any excavated surfaces revegetated or seeded with site appropriate grass mix.

Impacts on the Physical Environment

Evaluation of the impacts on the No-Action and Action Alternatives including **direct, secondary, and cumulative** impacts on the Physical Environment.

VEGETATION:

Vegetation Existing Conditions: The project site is dominated by riparian vegetation including broadleaf deciduous and mixed conifer forest. Historical timber harvest has occurred in the vicinity of the project area in the past. Noxious weeds are present in the project area including; spotted knapweed (*Centaurea stoebe*), leafy spurge (*Euphorbia esula)*, Canada thistle (*Cirsium arvense*), and houndstongue (*Cynoglossum officinale*). Rare plants potentially found in the project area include; Howell's Gumweed (*Grindelia howellii*). Howell's Gumweed is a sensitive plant with limited distribution in Missoula and Powell counties, the

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Noxious Weeds	**X**				**X**				**X**					
Rare Plants	**X**				**X**				**X**					
Vegetative community	**X**				**X**				**X**					
Old Growth	**X**				**X**				**X**					
Action														
Noxious Weeds		**X**				**X**				**X**			**Y**	**1**
Rare Plants	**X**				**X**				**X**					
Vegetative community		**X**				**X**				**X**			**Y**	**2**

Vegetation	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Old Growth	**X**				**X**				**X**					

Comments:

1. Equipment would be inspected prior to work to minimize introduction of noxious weeds.
2. Vegetation in areas to be excavated would be salvaged to the extent possible and replanted onsite. Limited timber harvest would occur to obtain sufficient diameter trees to construct the log jam. Harvest would be selective and utilize disease impacted trees to the extent possible within the requirements of the log-jam design. Not more than 30 trees would be harvested.

Vegetation Mitigations:

1. Mitigation of disturbed riparian vegetation would be completed by salvaging existing vegetation from excavated areas and replanting vegetation on-site to stabilize the constructed berm. Additional planting would occur following completion of the project with site-appropriate riparian shrubs and grasses.

GEOLOGY AND SOILS

Existing Conditions

The proposed project is located along Cottonwood Creek, which flows south from the Swan Range. At the project location, downstream of the confluence with Spring Creek, Cottonwood Creek is located on alluvium transported by glacial outwash events and stream flood events (Mudge et al., 2001). Cottonwood Creek's substrate is cobble to boulder-sized with active bar deposition, lateral channel migration, and bank erosion that appears to have historically and recently has resulted in migration or rerouting of the channel mainstem within the alluvial fan and floodplain. Further discussion of channel dynamics and water quality vulnerabilities under existing, no-action, and proposed conditions is in the following Water Quality and Quantity analysis section of this EA.

Existing roads and skid trails do not access the project location.

Slopes in the project area and surrounding areas are shallow and generally do not exceed 10%.

Past and Current Disturbances

Known past and current disturbances in and adjacent to the project area include the following:

- Timber harvest within Section 16 T14N R24W, 1992-1993, "Helen's Camp Timber Sale"
- Fire burned approximately 32% of upstream watershed, 2018, "Rice Ridge Fire"
- Restricted access roads and skid trails
- Recreational use including horse trails
- Active and non-active channel diversion and flow measurement structures

Comments

Areas beyond the road prism that would be directly affected by the project include the equipment access route to the stream bank and areas adjacent to the stream bank. Primary soils concerns associated with project implementation are physical disturbance to soils associated with equipment access. Disturbed soils are at greater risk of accelerated erosion, reduced nutrient cycling, and reduced productivity due to compaction. Existing slopes are shallow, therefore unstable or slope destabilization is not a risk.

Mitigation

The following mitigation measures would avoid or reduce the risk of soil impacts:

- Equipment movement between existing roads and the project area would be done to limit soil compaction. Including selection of a route that avoids low wet areas.
- Equipment passes between existing roads and the project area would be minimized.
- Rubber-tired equipment would be used for transporting rock and fill material between existing roads and the project area. If rubber-tired equipment is not available for the work a tracked truck would be used to haul the rock.
- At the end of project equipment operations, if compaction has occurred (e.g., shovel refusal and/or platy soil structures with horizontal orientation when compared with adjacent untracked areas) the temporary access route would be ripped 6-12 inches
- Temporary access routes would be grass seeded and obscured with slash.

Soil Disturbance and Productivity	Impact with Mitigation											
	Direct				Secondary				Cumulative			
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High
No-Action												
Physical Disturbance (Compaction and Displacement)	**X**				**X**				**X**			
Hillslope Erosion	**X**				**X**							
Nutrient Cycling	**X**				**X**				**X**			
Slope Stability	**X**				**X**				**X**			
Soil Productivity	**X**				**X**				**X**			
Action												
Physical Disturbance (Compaction and Displacement)		**X**			**X**					**X**		
Hillslope Erosion		**X**				**X**				**X**		
Nutrient Cycling		**X**				**X**				**X**		
Slope Stability	**X**				**X**				**X**			
Soil Productivity		**X**				**X**				**X**		

References

Mudge, M.R., Earhart, R.L., Whipple, J.W., and Harrison, J.E., 2001, Geologic and Structure Map of The Choteau 1° x 2° Quadrangle, Western Montana: A Digital Database. US Geological Survey Miscellaneous Investigative Series Map I-1300.

WATER QUALITY AND QUANTITY:

Water Quality and Quantity Existing Conditions:

The proposed project is located along Cottonwood Creek, which flows south from the Swan Range. At the project location, downstream of the confluence with Spring Creek, Cottonwood Creek is located on alluvium transported by glacial outwash events and stream flood events (Mudge et al., 2001). Cottonwood Creek's substrate is cobble to boulder-sized with active bar deposition, lateral channel migration, and bank erosion that appears to have historically and recently has resulted in migration or rerouting of the channel mainstem within the alluvial fan and floodplain.

Cottonwood Creek is a major tributary to the Blackfoot River and is fully supporting of all beneficial uses (MTDEQ 2016 and 2008). Historically, Cottonwood Creek was listed for flow alterations, habitat alterations, and siltation (MDEQ 2008).

Past and Current Disturbances

Known past and current disturbances in and adjacent to the project area and Cottonwood Creek include the following:

- Timber harvest within Section 16 T14N R24W, 1992-1993, "Helen's Camp Timber Sale"
- Fire burned approximately 32% of upstream watershed, 2018, "Rice Ridge Fire"
- Restricted access roads and skid trails
- Recreational use including horse trails
- Active and non-active channel diversion and flow measurement structures
- Restoration projects beginning in 1990, including improvements to fish passage, riparian vegetation, range/riparian habitat, and irrigation conditions (Blackfoot Challenge 2005 and MTDEQ 2008).

The burned areas associated with the Rice Ridge Fire occupy a substantial portion (32%) of the Cottonwood Creek watershed thereby potentially increasing the total stream discharge, peak discharge, and sediment yield to the creek in the area of the project.

One of the chief purposes of the project is to address water quality and quantity issues associated with a diversion structure that was largely removed during spring runoff in 2018. Consequently, there is currently no flow control from Cottonwood Creek to the irrigation ditch. This has resulted in continuous and unchecked diversion of a portion of Cottonwood's streamflow to the ditch and a vulnerability of total streamflow diversion to the ditch with another peak runoff event. The photos below document the ditch prior to failure, the diversion structure during high flows in 2018, and the failed structure in the summer of 2018.

The project area and diversion structure prior to significant erosion event.	The project area and diversion structure following peak flows in 2018.
	
Date: November 2013, by Michael McLane (MTFWP)	Date: August 2018 (DNRC)

Comments

The project would not affect water yield, but benefit instream flow over the no-action alternative by controlling the release of streamflow down the ditch at the location of the failed diversion. Instream flow and flow regime benefits are analyzed in the Fisheries analysis section of this EA.

The project would have short-duration direct water quality impacts during implementation that would be mitigated with construction best management practices (BMPs) that would limit direct delivery and mobilization of sediment to Cottonwood Creek and the irrigation ditch (see mitigation below). Water quality impacts associated with project implementation are anticipated to be short duration and have a low potential for measurable changes to the sediment load downstream.

Overall the project would benefit water quality in the area of the project by mitigating the risk of stream diversion to the irrigation ditch which would cause dewatering to or abandonment of the main channel and cause significant erosion and sedimentation issues within the diversion ditch with risk of return delivery to Cottonwood Creek and/or other surface waters downstream.

Mitigation

The following project plan elements can be considered mitigation that would avoid or reduce the risk of water quality impacts.

- Temporary construction BMPs would be used to reduce erosion and sedimentation to Cottonwood Creek and the irrigation ditch.
- A fisheries and/or hydrologist would be on-site during project implementation to assist with BMPs and administration.

Water Quality & Quantity	Impact											
	Direct				Secondary				Cumulative			
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High
No-Action												
Water Quality				X				X			X	
Water Quantity	X				X				X			
Action												
Water Quality		X				X				X		
Water Quantity	X				X					X		

References

Blackfoot Challenge, 2005. A Basin-Wide Restoration Action Plan for the Blackfoot Watershed. Missoula, MT: Blackfoot Challenge.

MTDEQ (Montana Department of Environmental Quality), 2016, Montana Final 2016 Water Quality Integrated Report, http://deq.mt.gov/Water/Resources/cwaic/reports

MTDEQ, 2008, Middle Blackfoot-Nevada Creek Total Maximum Daily Loads and Water Quality Improvement Plan: Sediment, Nutrient Trace Metal and Temperature TMDLs, http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C03-TMDL-02a.pdf

Mudge, M.R., Earhart, R.L., Whipple, J.W., and Harrison, J.E., 2001, Geologic and Structure Map of The Choteau 1° x 2° Quadrangle, Western Montana: A Digital Database. US Geological Survey Miscellaneous Investigative Series Map I-1300.

FISHERIES:

Fisheries Existing Conditions: Cottonwood Creek supports populations of native and non-native species including:

- Native:
  - Bull Trout (*Salvelinus confluentus*)
  - Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisii*)
  - Mountain Whitefish (*Prosopium williamsoni*)
  - Longnose dace (*Rhinichthys cataractae*)
- Non-native
  - Rainbow Trout (*O. mykiss*)
  - Brown Trout (*Salmo trutta*)
  - Brook Trout (*S. fontinalis*)

Additionally, bull x brook trout and westslope cutthroat x rainbow trout hybrids have been confirmed in the watershed.

Downstream from the project area, a fish screen was installed on the Dreyer Ditch to minimize entrainment of migrating juvenile and adult salmonids in Cottonwood Creek (Figure 1). Stream habitat conditions in Cottonwood Creek in the project area are typical of an alluvial stream channel in relatively unconstrained geography. Multiple remnant stream channels are present in the section, which is indicative of the low levels of channel constraint. Channel gradient in the project area is between 1.5-2.0%, streambanks are well vegetated and stable throughout the analysis area. Substrates are dominated by large gravel-cobble with low levels of embeddedness. Large woody debris and stream shade measurements on Cottonwood Creek

immediately downstream from the project site were 37 pieces/1000' and 67.5 ± 5.32 (95% C.I.) respectively. Values are likely within the historic range of variability for this stream type (DNRC 2010). Stream temperature monitoring indicates that Cottonwood Creek is high quality cold-water habitat with maximum observed temperatures between June-October 2018 not exceeding 14.0°C. This reach of Cottonwood Creek is designated spawning and rearing critical habitat for Bull Trout.

No-Action: Under the No-Action Alternative, the existing failed diversion structure would remain in the current state, with the gabion basket wall that composed the majority of the structure continuing to constrict approximately 40% of the channel width. Continued erosion of the irrigation diversion would occur, potentially lowering the active channel, leading to a channel avulsion event that could lead to establishment of a new active channel in the previous ditch system.

Abandonment of the current channel would have significant effects on fisheries resources in the lower 10 miles of Cottonwood Creek including;

- Alterations to the flow regime as the stream attempts to reestablish an active channel,
- Reduction in large woody debris in the new channel,
- Decreased stream shading due to the lack of riparian vegetation on the ditch system as well as overland flow increasing the surface area of the stream available to solar radiation
- Increased stream temperature due to increased solar radiation and overland flow
- Significant disruptions to fish population connectivity between the Blackfoot River, lower Cottonwood Creek, and upper Cottonwood Creek.
- Significant impacts on fisheries populations if Cottonwood Creek downstream from the project location were to become dewatered.

Action Alternative (see Fisheries table below):

Fisheries	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Sediment	X					X				X			N	1
Flow Regimes				X				X				X	N	2
Woody Debris			X				X				X		N	2
Stream Shading			X				X				X		N	2
Stream Temperature	X						X				X		N	2
Connectivity				X				X				X	N	3
Populations				X				X				X	N	3
Action														
Sediment		X				X				X			N	1
Flow Regimes		X				X				X			Y	4
Woody Debris	X				X				X					5
Stream Shading		X				X				X			Y	6
Stream Temperature	X				X				X				Y	5
Connectivity				X				X				X	Y	7

Fisheries	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Populations				**X**				**X**				**X**	**Y**	**7**

Comments:

1. Existing sediment impacts in the project area are largely resultant from disturbance related to the Rice Ridge Fire (Sylte et al. 2017). Sediment effects are anticipated to continue for 5-7 years following wildfire depending on fire severity and vegetation recovery.
2. Moderate risk of moderate adverse impacts to large woody debris, stream shading, and stream temperature are anticipated if channel avulsion processes continue in Cottonwood Creek resulting in the abandonment of the stream channel. Reductions in stream shading would be anticipated as the irrigation ditch does not have a well-developed riparian community. Coincidental increases in stream temperatures would be expected in the event of channel abandonment as the irrigation ditch capacity would be greatly exceeded by the average discharge of Cottonwood Creek. Overland flow would result in increased water surface area available to solar radiation leading to increased water temperature. Large woody debris would also be negatively impacted by abandonment of the existing channel as it would likely take multiple years to reestablish woody debris.
3. High risk of high impacts to fisheries connectivity and populations is anticipated under the No-Action Alternative. Continued channel avulsion processes will likely continue leading to development of the irrigation ditch as the main channel of Cottonwood Creek. Abandonment of the existing channel would isolate portions of Cottonwood Creek from the Blackfoot River indefinitely, decreasing genetic exchange, which over long periods of time may impact populations (Carim et al. 2016).
4. Under the Action Alternative there is an anticipated low risk of low impacts to flow regime resulting from increased discharge in Cottonwood Creek by eliminating this point of diversion. Increased discharge may affect existing road-stream crossings downstream on Woodworth Road and on DNRC lands downstream.
5. Under the Action Alternative, there are no anticipated impacts to large woody debris or stream temperature. Incorporation of large woody debris into the irrigation ditch plug will increase streambank stability and minimize erosion of the ditch plug. Stream temperature is primarily impacted through reductions in stream shading. Anticipated impacts to stream shading as a part of this project will be extremely localized with impacted areas being limited to the project site. The magnitude of vegetation removal will be limited to approximately 0.05 acres, of which 30 feet of streambank will be improved as a part of the irrigation ditch plug. Vegetation recovery should be rapid, with regeneration of woody riparian species as well as planting areas disturbed during work. Trees harvested for construction of the log-jam structure would be collected from areas outside the SMZ.

6. Under the Action Alternative, there may be localized reduction in stream shading resulting from construction of the irrigation ditch plug. Reductions are anticipated to be minor with approximately 0.05 acres of riparian vegetation impacted. Adverse impacts will likely be short term, moderated by regeneration of riparian vegetation and planting after construction is complete.
7. There is an anticipated high positive impact on connectivity and fish populations as a result of implementation of the Action Alternative. Construction of the irrigation ditch plug and removal of the channel constriction should diminish the likelihood of continued channel avulsion and potential channel abandonment.

Fisheries Mitigations:

1. The majority of construction actions will take place from streambanks with minimal to no instream equipment operation. Reducing instream equipment operation will decrease short-term introduction of sediments.
2. DNRC would implement all applicable forestry BMPs, Montana Administrative Rules for Forest Management, and reasonable mitigation and erosion control practices during project implementation.
3. Exposed erosive soils will be revegetated with site appropriate vegetation including shrubs and grasses.

WILDLIFE:

No-Action: The potential effects of the No-Action Alternative on wildlife would include no alterations to the distribution of animals on the landscape. Channel avulsion would alter the current course of Cottonwood Creek in the project area, which would affect how wildlife populations utilize microscale habitats associated with the stream channel which would develop over time. There is an anticipated low level effect for all species present or assumed to be present in the project area.

Action Alternative (see Wildlife table below):

Wildlife	Impact												Can Impact be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Threatened and Endangered Species														
Grizzly bear *(Ursus arctos)* Habitat: Recovery areas, security from human activity		**X**				**X**				**X**			**Y**	**1**
Canada lynx (*Felix lynx)* Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone		**X**				**X**				**X**			**Y**	**1**

Wildlife	Impact												Can Impact be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Yellow-Billed Cuckoo (Coccyzus americanus) Habitat: Deciduous forest stands more than 25 acres with dense understories-generally found in large river bottoms	**X**				**X**				**X**				**N/A**	**2**
Sensitive Species														
Bald eagle *(Haliaeetus leucocephalus)* Habitat: Late-successional forest within 1 mile of open water	**X**				**X**				**X**				**N/A**	**2**
Black-backed woodpecker *(Picoides arcticus)* Habitat: Mature to old burned or beetle-infested forest	**X**				**X**				**X**				**N/A**	**2**
Coeur d'Alene salamander *(Plethodon idahoensis)* Habitat: Waterfall spray zones, talus near cascading streams	**X**				**X**				**X**				**N/A**	**2**
Columbian sharp-tailed grouse *(Tympanuchus Phasianellus columbianus)* Habitat: Grassland, shrubland, riparian, agriculture	**X**				**X**				**X**				**N/A**	**2**
Common loon *(Gavia immer)* Habitat: Cold mountain lakes, nest in emergent vegetation	**X**				**X**				**X**				**N/A**	**2**
Fisher *(Martes pennanti)*		**X**				**X**				**X**			**Y**	**1**

Wildlife	Impact												Can Impact be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian														
Flammulated owl *(Otus flammeolus)* Habitat: Late-successional ponderosa pine and Douglas-fir forest		**X**				**X**				**X**			**Y**	**1**
Gray Wolf *(Canis lupus)* Habitat: Ample big game populations, security from human activities		**X**				**X**				**X**			**Y**	**1**
Harlequin duck *(Histrionicus histrionicus)* Habitat: White-water streams, boulder and cobble substrates	**X**				**X**				**X**				**N/A**	**2**
Northern bog lemming *(Synaptomys borealis)* Habitat: Sphagnum meadows, bogs, fens with thick moss mats	**X**				**X**				**X**				**N/A**	**2**
Mountain plover (*Charadrius montanus*) Habitat: short-grass prairie & prairie dog towns	**X**				**X**				**X**				**N/A**	**2**
Peregrine falcon *(Falco peregrinus)* Habitat: Cliff features near open foraging areas and/or wetlands	**X**				**X**				**X**				**N/A**	**2**
Pileated woodpecker *(Dryocopus pileatus)* Habitat: Late-successional		**X**				**X**				**X**			**Y**	**1**

Wildlife	Impact												Can Impact be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
ponderosa pine and larch-fir forest														
Townsend's big-eared bat *(Plecotus townsendii)* Habitat: Caves, caverns, old mines	**X**				**X**				**X**				**N/A**	**2**
Wolverine (Gulo gulo) Habitat: Alpine tundra and high-elevation boreal forests that maintain deep persistent snow into late spring		**X**				**X**				**X**			**Y**	**1**
Big Game Species														
Elk		**X**			**X**					**X**			**Y**	**1**
Whitetail		**X**			**X**					**X**			**Y**	**1**
Mule Deer		**X**			**X**					**X**			**Y**	**1**
Bighorn Sheep	**X**				**X**				**X**				**N/A**	**2**
Other	**X**				**X**				**X**				**N/A**	

Comments:

1. The primary mechanism for potential effects to wildlife under the action alternative would be due to construction related activities during project activities. Implementation of the project would occur over 4-5 days, and would include; mobilization of equipment from the staging area near the existing fish screen, transport of project materials to the project location, and implementation of the project. Potential effect mechanisms would be through direct displacement of wildlife by project related traffic during transport of materials to the staging area (1-2 days; 3-4 equipment trips), transport of materials from the staging area to the project site (0.25 miles; 4-5 round trips with equipment), and construction activities at the project location (2-3 days total duration). Minimal impacts to wildlife habitat are expected under the proposed alternative, and would be limited to:
    a. Ground disturbance along the access route from the staging area to the project site.
        i. Vegetation disturbed on the access route will be restored to the extent possible through reseeding and placement of slash
    b. Disturbance at the project site would be limited to approximately 0.05 acres of habitat which would be altered by construction of the irrigation ditch plug.
        i. Vegetation will be replanted on the irrigation ditch plug to facilitate recovery and offset potential forage losses to wildlife.
    c. Selective harvest of not more than 30 trees.

i. Harvest will be selective (focusing on trees <21" dbh), and dispersed to the extent possible to prevent alterations to stand structure, stocking rate, and cover.

2. The project area is either out of the range of the normal distribution for this species or suitable habitat is not present. A query of the Montana Natural Heritage Program database did not identify these species as being potentially present. Thus, no direct, indirect, or cumulative effects would be anticipated.

Wildlife Mitigations: Trees used to construct the log-jam structure will be <21" dbh to minimize potential effects on wildlife habitat.

AIR QUALITY:

Air Quality	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Smoke	**X**				**X**				**X**					
Dust	**X**				**X**				**X**					
Action														
Smoke	**X**				**X**				**X**					
Dust		**X**			**X**					**X**			**N**	**1**

Comments: There is an anticipated very low risk of very low level impacts on air quality resulting from project related traffic. The majority of traffic related impacts to air quality will occur as a result of transport of equipment and materials to the site. Materials to be transported are primarily rock armoring for the constructed streambank, which should be completed in 4-5 days with fewer than 10 truck trips between the rock source and the project location.

Air Quality Mitigations: No mitigations are suggested as the impact level is very low, and likely within the average volume of traffic adjacent to the project area.

ARCHAEOLOGICAL SITES / AESTHETICS / DEMANDS ON ENVIRONMENTAL RESOURCES:

The DNRC staff archaeologist conducted a Class II cultural and paleontologic resource inventory of the general area of potential effect (APE) as part of the Kozy Korner timber sale. The Class II inventory consisted of a literature review and a pedestrian inventory of selected acreages that overlapped the APE for this development. No cultural or paleontologic resources were identified, so there should be No Effect to historic properties (heritage properties under the Montana State Antiquities Act) if the proposed action/undertaking proceeds as planned.

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Historical or Archaeological Sites	**X**				**X**				**X**					
Aesthetics	**X**				**X**				**X**					
Demands on Environmental Resources of Land, Water, or Energy	**X**				**X**				**X**					
Action														
Historical or Archaeological Sites	**X**													
Aesthetics	**X**				**X**				**X**					
Demands on Environmental Resources of Land, Water, or Energy	**X**				**X**				**X**					

OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA: *List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.*

- Blackfoot River Watershed Restoration Plan; Water Quality Addendum to the Blackfoot Subbasin Plan
    - 2014: Blackfoot Challenge

Impacts on the Human Population

Evaluation of the impacts on the proposed action including **direct, secondary, and cumulative** impacts on the Human Population.

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
No-Action														
Health and Human Safety				**X**				**X**				**X**	**N**	**1**
Industrial, Commercial and Agricultural Activities and Production				**X**				**X**				**X**	**N**	**1**
Quantity and Distribution of Employment	**X**								**X**					
Local Tax Base and Tax Revenues	**X**								**X**					

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Demand for Government Services				**X**				**X**				**X**	**N**	**1**
Access To and Quality of Recreational and Wilderness Activities	**X**													
Density and Distribution of population and housing	**X**													
Social Structures and Mores	**X**													
Cultural Uniqueness and Diversity	**X**													
Action														
Health and Human Safety		**X**				**X**				**X**			**Y**	**2**
Industrial, Commercial and Agricultural Activities and Production		**X**				**X**				**X**			**Y**	**2**
Quantity and Distribution of Employment	**X**													
Local Tax Base and Tax Revenues	**X**													
Demand for Government Services		**X**				**X**				**X**			**Y**	**2**
Access To and Quality of Recreational and Wilderness Activities	**X**													
Density and Distribution of population and housing	**X**													
Social Structures and Mores	**X**													
Cultural Uniqueness and Diversity	**X**													

Comments:

1. Under the No-Action Alternative, there would be high anticipated impacts to the following metrics resulting from complete channel avulsion and delivery of Cottonwood Creek discharge to the irrigation diversion:
    a. Health and Human Safety: During 2018 spring high flow, Woodworth Road was inundated by discharge from the irrigation ditch for several weeks limiting access to residences. Additionally, flooding threatened a power substation on Woodworth Road which would have impacted power distribution locally.

   b. Industrial, commercial, and agricultural activities and production: Channel avulsion and abandonment would result in increased flooding compared with 2018 levels, potentially impacting agricultural fields downstream.
   c. Demand for government services: Increased flooding due to channel avulsion and potential abandonment would likely result in increased need for infrastructure repair and construction which would impact county roads, road-stream crossings, and a power substation.
2. Under the Action Alternative impacts to Health and Human Safety; Industrial, commercial, and agricultural activities; and Demand for government services would be reduced to a low potential impact. The reduction in impacts is a result of the repaired irrigation diversion structure which would likely decrease the volume of Cottonwood Creek discharge delivered down the irrigation ditch. Reduced flow volume would minimize potential impacts to road infrastructure, the power substation and necessary road repair work conducted by the county on Woodworth Road. Implementation of the project would also reduce potential impacts on private landowners adjacent to the project area who may be impacted by the channel avulsion and abandonment of Cottonwood Creek.

Mitigations:

1. Impacts of the No-Action Alternative would not be mitigated as the result of continued channel avulsion and potential abandonment of the current channel of Cottonwood Creek would likely result in significant flooding and impacts to downstream resources.
2. Implementation of the proposed actions would minimize the potential for Cottonwood Creek to abandon the existing channel. As this action would be positive, mitigations would not be necessary.

References

DNRC 1996. State forest land management plan: final environmental impact statement (and appendixes). Montana Department of Natural Resources and Conservation, Forest Management Bureau, Missoula, Montana.

DNRC. 2010. Montana Department of Natural Resources and Conservation Forested State Trust Lands Habitat Conservation Plan: Final EIS, Volume II, Forest Management Bureau, Missoula, Montana.

Does the proposed action involve potential risks or adverse effects that are uncertain but extremely harmful if they were to occur?
No

Does the proposed action have impacts that are individually minor, but cumulatively significant or potentially significant?
No

Environmental Assessment Checklist Prepared By:

Name: Mike Anderson
Title: Fisheries Biologist
Date: November 26, 2018

Finding

Alternative Selected

After review of the Environmental Assessment Checklist (EAC), as well as all applicable rules, plans, and laws, the decision has been made to select the Action Alternative.

The Action Alternative meets the intent of the project objective to repair an existing irrigation diversion structure that was damaged during high stream discharge in spring 2018.

Significance of Potential Impacts

The EAC addressed the identified potential resource issues through proposed mitigation measures which incorporate all the applicable rules, plans, guidelines, and laws.

This approach resulted in an Action Alternative in which potential effects to several resources were expected to be negligible, minimal, minor, or low. These resources will not be discussed in further detail.

One resource specifically noted high expected effects associated with the Action Alternative. Fisheries – Direct, indirect, and cumulative effects to connectivity and populations are expected to be high. However, this is an anticipated high positive impact as a result of implementation of the Action Alternative (p. 13).

Given the expected effects, rationale, mitigations, and overall project benefits, no significant impacts are expected with the selection of the Action Alternative.

Need for Further Environmental Analysis

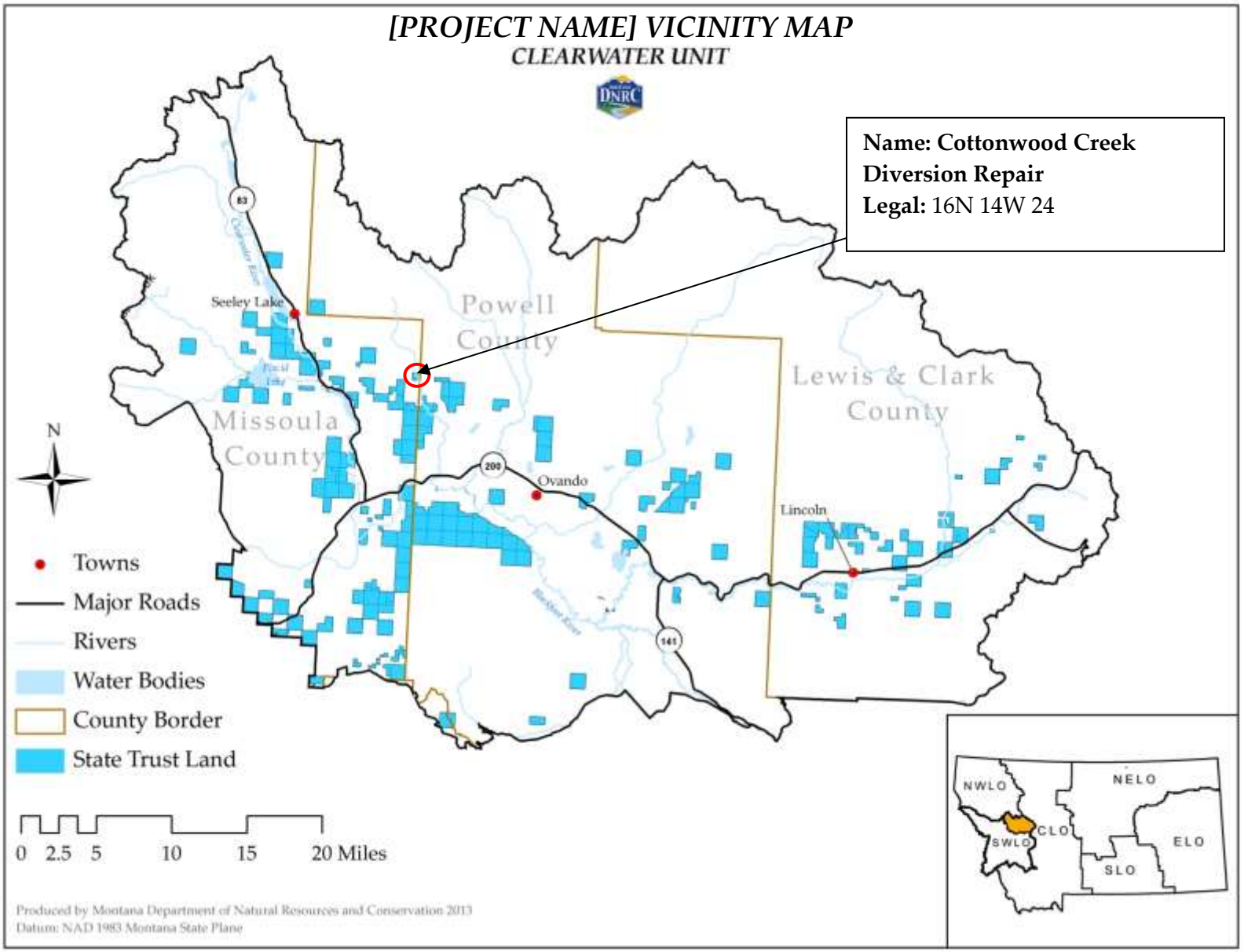
[ ]	EIS	[ ]	More Detailed EA	[x]	No Further Analysis

Environmental Assessment Checklist Approved By:

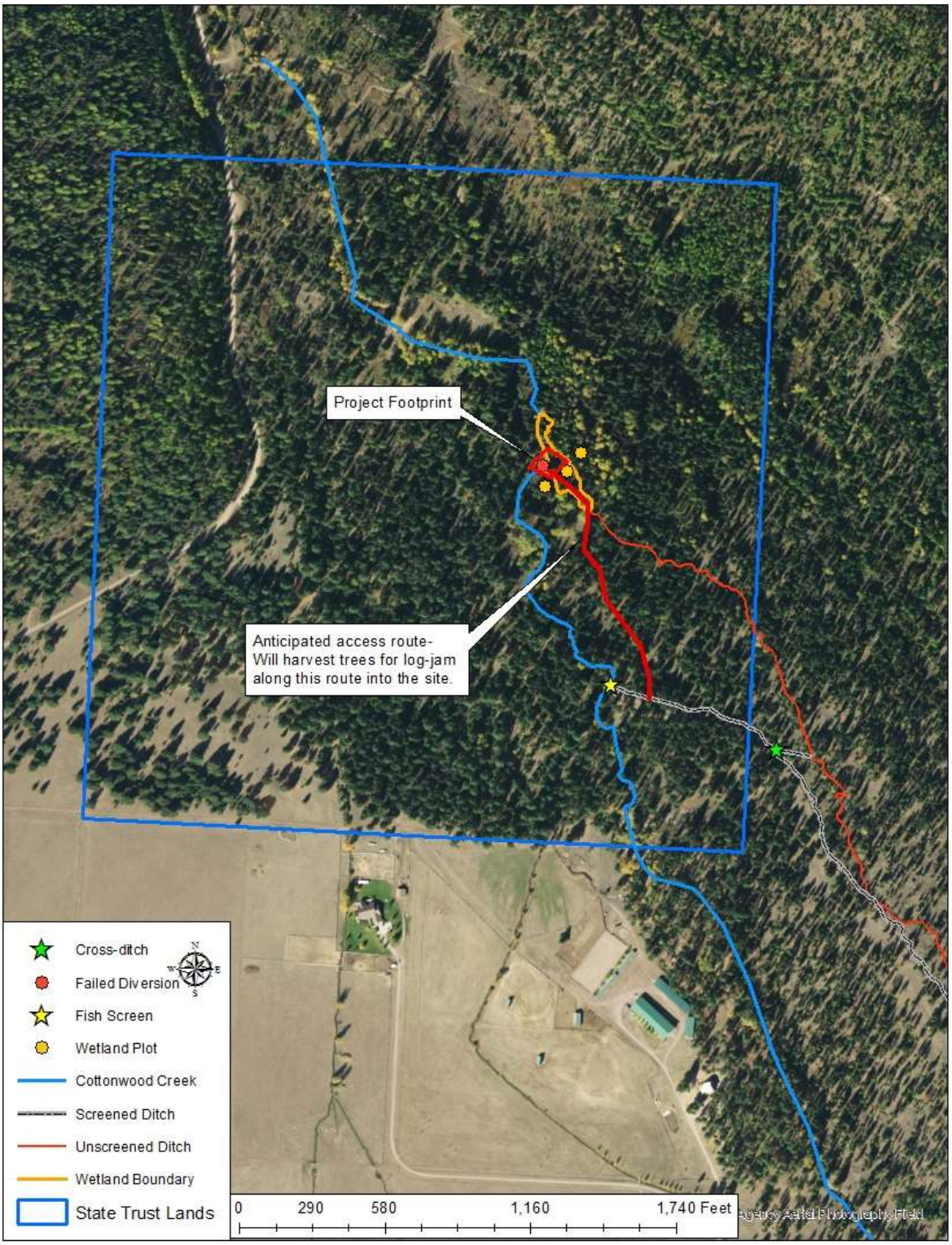
Name: Kristen Baker-Dickinson
Title: Clearwater Unit Manager
Date: November 28, 2018
Signature: /s/ K. Baker-Dickinson

Attachment A- Maps and Figures

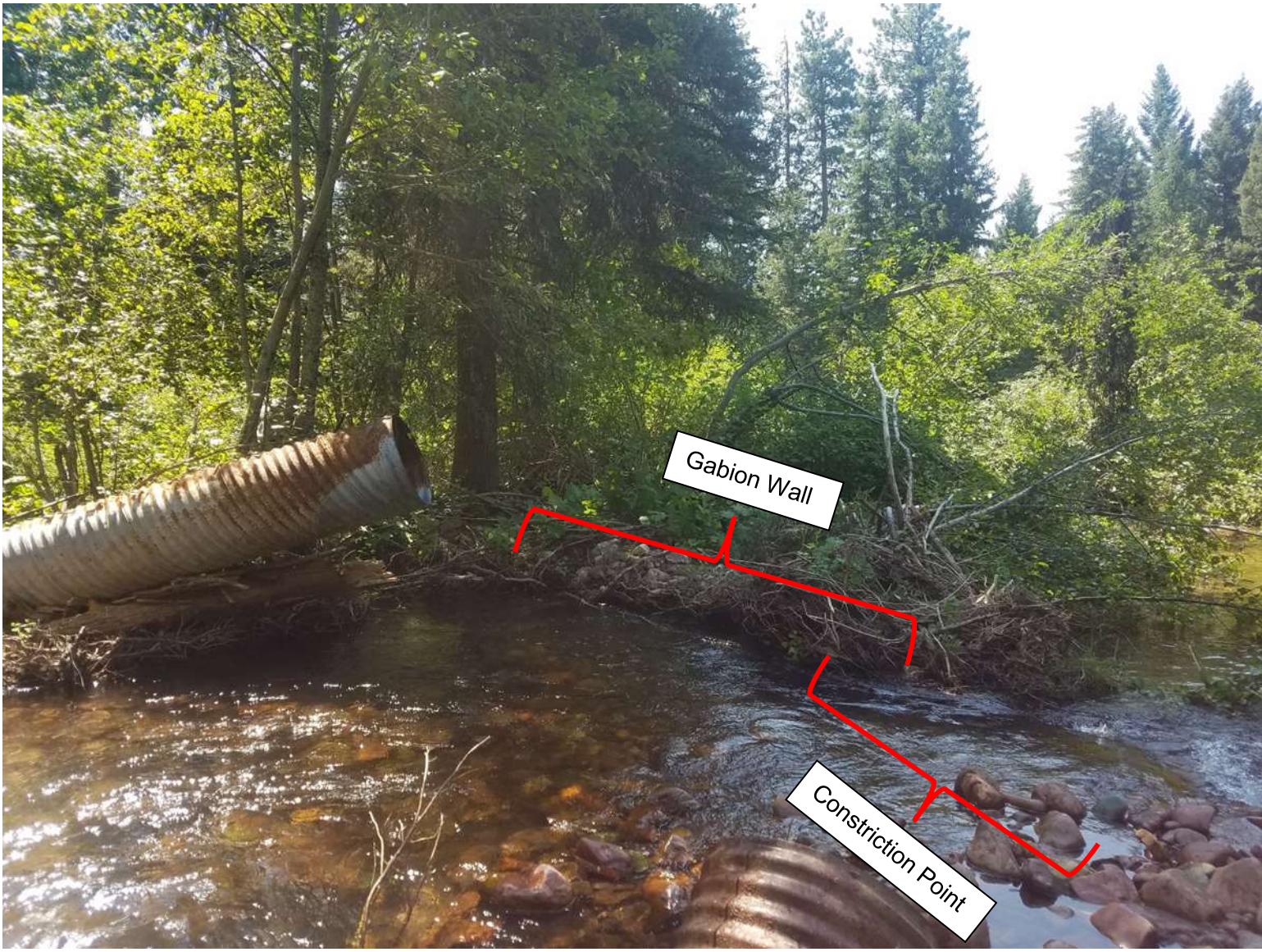
A-1: Timber Sale Vicinity Map



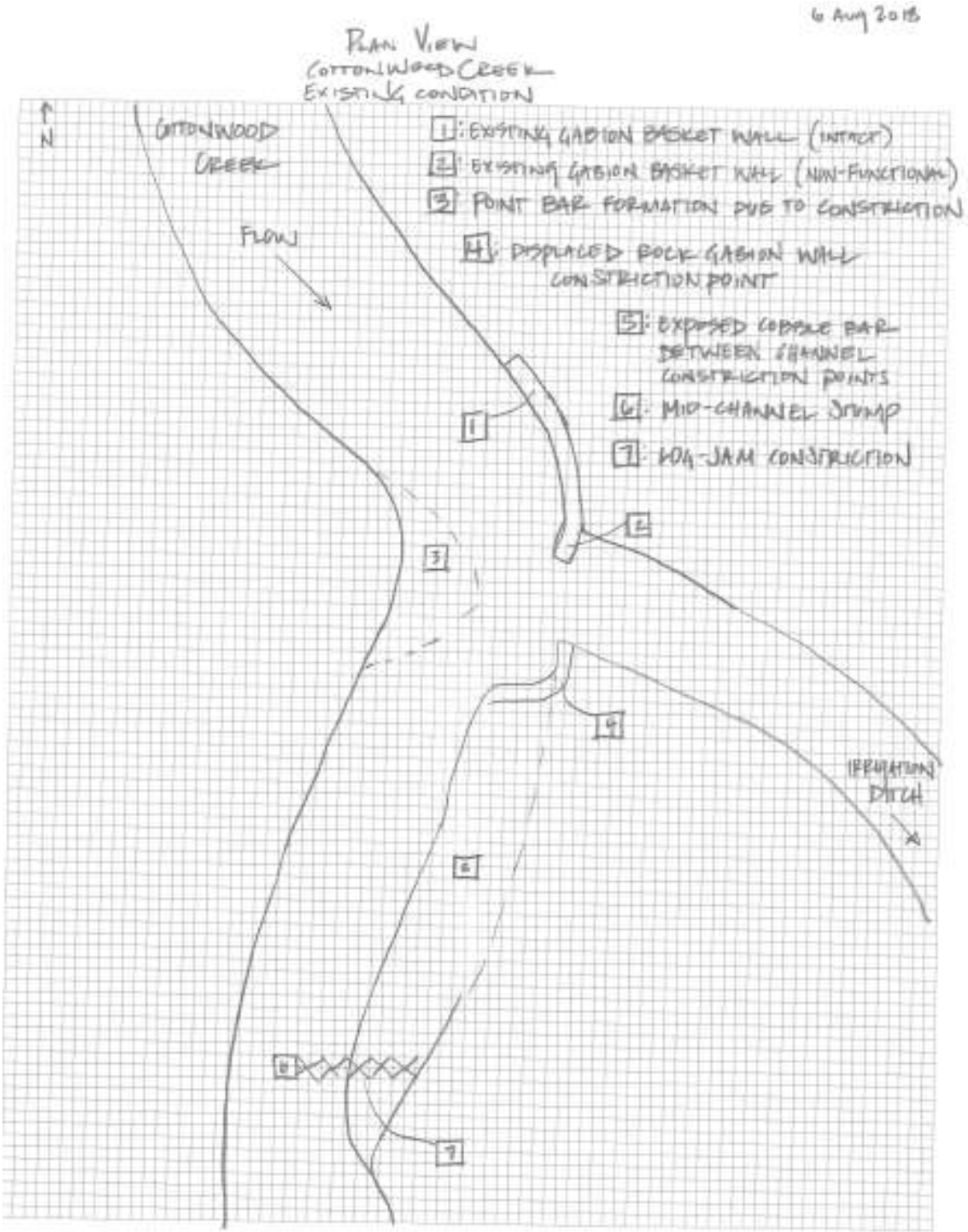
A-2: Project Area Map



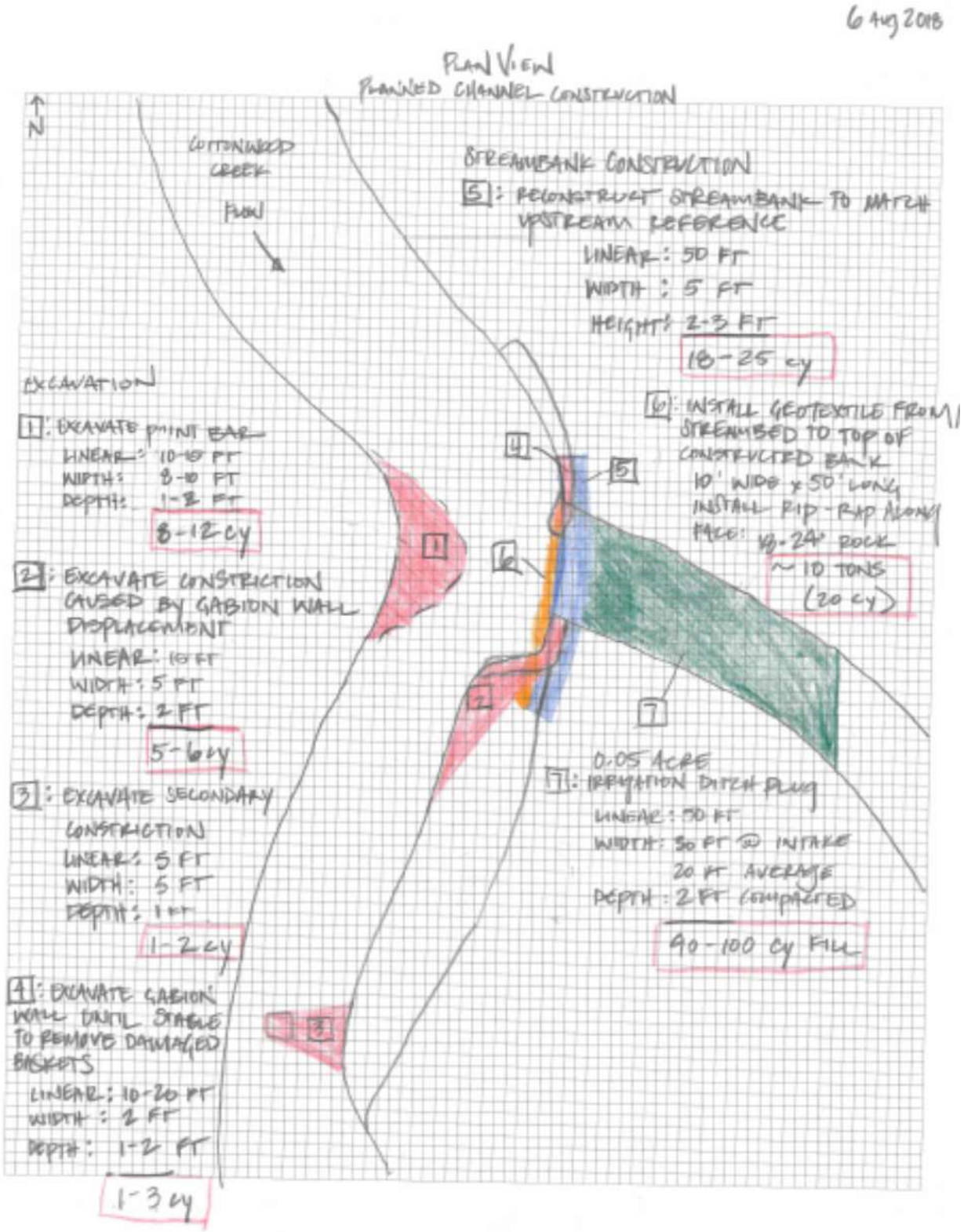
A-3: Exisitng conditions at the point of diversion highlighting the failed diversion structure and stream channel constriction.



A-4: Plan view of existing conditions at the point of diversion.



A-5: Planned activities to abandon the point of diverison and eliminate channel features leading to the channel avulsion.



A-6:Representative stream cross sections to be used to construct channel dimensions at the point of diversion. Existing conditions are in the upper pane and proposed conditions are in the lower pane.